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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,364	02/19/2002	Gary Lock	5626	6886

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EXAMINER

DIAMOND, ALAN D

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 10/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/031,364

Applicant(s)

LOCK ET AL.

Examiner

Alan Diamond

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 and 27-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 and 27-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 2, 2005 has been entered.

Drawings

2. The drawings filed August 2, 2005 have been accepted by the Examiner.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6, 10, 11, 16, 17, 21, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Becker et al, WO 97/27933.

Becker et al discloses a method for determining the properties of a particle, including its response to a chemical or physical agent, and for separating particles of more than one type, comprising the steps of applying to a suspension of particles a first signal at a first frequency and at a plurality of different phases whereby the particles experience a traveling wave dielectrophoretic force of which there is a real part which is

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negative and of which there is also an imaginary part, and simultaneously applying a second signal at a second frequency whereby either the real part or the imaginary part of the traveling wave dielectrophoretic force on the particles at the first frequency is altered in magnitude (see p. 10, line 8 through p. 13, line 10; p. 22, line 19 through p. 23, line 2; p. 23, line 24 through p. 24, line 19; and claims 1, 16, 36-38; 42-44, 50-54, 56-58, 62, and 65-68). It is the Examiner's position that there inherently is a traveling wave dielectrophoretic window, as per instant claim 2. Becker et al also discloses an apparatus for the application of traveling wave dielectrophoresis comprising an electrode array on a substrate, first frequency signal operating means, frequency signal generating means, means for electrically summing the two signals from such means and applying the summed signal to the electrode array (see p. 10, line 8 through p. 13, line 10; p. 22, line 19 through p. 23, line 2; p. 23, line 24 through p. 24, line 19; and claims 1, 16, 36-38; 42-44, 50-54, 56-58, 62, and 65-68). Levitation of cells is performed, as per instant claim 3 (see p. 39, lines 8-16; and p. 44, lines 1-10). Becker et al teaches the separation of leukemia cells from human blood cells (see p. 37, line 24 through p. 38, line 11). With respect to the limitation in claims 1 and 16 of a stationary liquid, it is noted that Becker et al teaches that its method can be carried out in a "pulse" or "batch" mode wherein particles are injected into the chamber of the apparatus and there are no particles removed from the apparatus, i.e., a stationary fluid, for a period of time, and during this period of time the electrical signals are applied (see page 18, lines 15-20; page 34, lines 17-21; page 35, line 5; and page 36, line 6). With respect to claim 23, Becker et al's chamber can receive a fixed quantity of liquid because, as noted

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above, Becker et al's method can be carried out in a pulse or batch mode wherein particles are injected in to the chamber of the apparatus and there is nothing removed from the apparatus. With respect to the requirement in claim 23 that the electrode array forms a wall of the cell, note that Becker et al's device can be a thin enclosed chamber wherein the electrode array is along a portion or all of the chamber, such as on the top and/or bottom walls, and/or side walls (see page 29, lines 9-13). Since Becker et al teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-25 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becker et al, WO 97/27933.

Becker et al discloses a method for determining the properties of a particle, including its response to a chemical or physical agent, and for separating particles of more than one type, comprising the steps of applying to a suspension of particles a first signal at a first frequency and at a plurality of different phases whereby the particles experience a traveling wave dielectrophoretic force of which there is a real part which is negative and of which there is also an imaginary part, and simultaneously applying a second signal at a second frequency whereby either the real part or the imaginary part of the traveling wave dielectrophoretic force on the particles at the first frequency is

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altered in magnitude (see p. 10, line 8 through p. 13, line 10; p. 22, line 19 through p. 23, line 2; p. 23, line 24 through p. 24, line 19; and claims 1, 16, 36-38; 42-44, 50-54, 56-58, 62, and 65-68). It is the Examiner's position that there inherently is a traveling wave dielectrophoretic window, as per instant claim 2. Becker et al also discloses an apparatus for the application of traveling wave dielectrophoresis comprising an electrode array on a substrate, first frequency signal operating means, frequency signal generating means, means for electrically summing the two signals from such means and applying the summed signal to the electrode array (see p. 10, line 8 through p. 13, line 10; p. 22, line 19 through p. 23, line 2; p. 23, line 24 through p. 24, line 19; and claims 1, 16, 36-38; 42-44, 50-54, 56-58, 62, and 65-68). Levitation of cells is performed, as per instant claim 3 (see p. 39, lines 8-16; and p. 44, lines 1-10). Becker et al teaches the separation of leukemia cells from human blood cells (see p. 37, line 24 through p. 38, line 11). The application of the two frequency signals results in a time and horizontal displacement of matter (see p. 12, lines 3-15). The signals range from 10 kHz to 10 MHz (p. 13, lines 1-2). The use of a third signal would have been within the skill of an artisan. With respect to the limitation in claims 1 and 16 of a stationary liquid, it is noted that Becker et al teaches that its method can be carried out in a "pulse" or "batch" mode wherein particles are injected into the chamber of the apparatus and there are no particles removed from the apparatus, i.e., a stationary fluid, for a period of time, and during this period of time the electrical signals are applied (see page 18, lines 15-20; page 34, lines 17-21; page 35, line 5; and page 36, line 6). With respect to claim 23, Becker et al's chamber can receive a fixed quantity of liquid because, as noted

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above, Becker et al's method can be carried out in a pulse or batch mode wherein particles are injected in to the chamber of the apparatus and there are no particles removed from the apparatus. With respect to the requirement in claim 23 that the electrode array forms a wall of the cell, note that Becker et al's device can be a thin enclosed chamber wherein the electrode array is along a portion or all of the chamber, such as on the top and/or bottom walls, and/or side walls (see page 29, lines 9-13). Becker et al teaches the limitations of the instant claims other than the differences which are discussed below.

Becker et al does not specifically teach varying the speed of the particles. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have varied the speed of the particles so that the particles could be separated.

Becker et al does not specifically teach a first signal of 55 kHz for TWD and a second static DEP signal at a frequency of 55 kHz, whereby the TWD window extends between 10 kHz and 18 MHz. However, as noted above, Becker et al teaches signals that range from 10 kHz to 10 MHz. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a first signal of 55 kHz for TWD and a second static DEP signal at a frequency of 55 kHz, whereby the TWD window extends between 10 kHz and 18 MHz, because such is within the scope of Becker et al's disclosure.

With respect to claim 25, Becker et al does not specifically teach that the substrate for the electrode array is transparent; illumination means to illuminate the

substrate; and viewing means to view any particles on the substrate. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided for such features so that the particles could be viewed.

With respect to claim 27 and its dependent claims Becker et al does not specifically require that two types of particles travel in opposite directions. However, Becker et al does teach that in Figure 2A, when electrical signals are applied, the particles experience cDEP forces that cause them to move to characteristic distances, known as equilibrium position, from the side walls of the chamber where the electrode arrays are arranged. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had one set of particles with an equilibrium below the center and another with an equilibrium above the center so as to separate the particles. With such a situation, the particles move in opposite direction to be above and below the center. Only the expected results would be obtained.

Response to Arguments

7. Applicant's arguments filed August 2, 2005, 2005 have been fully considered but they are not persuasive.

Applicant argues that Becker et al does not teach or suggest a method for separating particles in a stationary fluid or that a second frequency is selected so that in the separation of different particles, the two types of particles travel in opposite directions. Applicant argues that in Becker et al, the field flow fractionation method cannot work in a stationary fluid and all particles travel along the chamber in the same direction at different velocities determined solely by the direction of fluid flow. However,

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these arguments are not deemed to be persuasive for the following reasons. Firstly, Becker et al does teach the use of a stationary fluid because, as noted above in the instant Office action, Becker et al teaches that its method can be carried out in a "pulse" or "batch" mode wherein particles are injected in to the chamber of the apparatus and there are no particles removed from the apparatus, i.e., a stationary fluid, for a period of time, and during this period of time the electrical signals are applied (see page 18, lines 15-20; page 34, lines 17-21; page 35, line 5; and page 36, line 6). Secondly, with respect to particles traveling in opposite directions, and as noted above in the instant Office action, Becker et al does teach that in Figure 2A, when electrical signals are applied, the particles experience cDEP forces that cause them to move to characteristic distances, known as equilibrium position, from the side walls of the chamber where the electrode arrays are arranged. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have had one set of particles with an equilibrium below the center and another with an equilibrium above the center so as to separate the particles. With such a situation, the particles move in opposite direction to be above and below the center.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 6,936,151 is hereby made of record.
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 571-272-

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1338. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alan Diamond
October 3, 2005

Alan Diamond
Primary Examiner
Art Unit 1753

A handwritten signature in black ink, appearing to read 'Alan Diamond', with a stylized flourish at the end.